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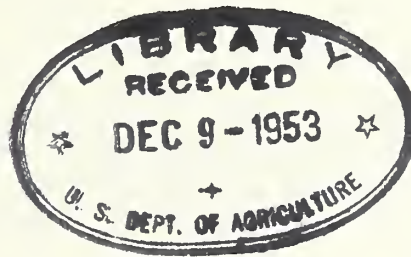
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U T A H 8 D U C H E S N E

FIELD APPRAISAL ANALYSIS

Prepared by
Economic Analysis Section
Electric Operations and Loans Division
RURAL ELECTRIFICATION ADMINISTRATION



Field Appraisal
Completed in
August 1953

*



October 19, 1953

Economic Analysis Section
Electric Operations and Loans Division

SUMMARY AND CONCLUSION
UTAH 8 DUCHESNE

AREA CHARACTERISTICS

During the period 1930-1950, the combined total population of Duchesne and Uintah Counties increased by about 7 percent. The farm population during this period decreased by approximately 25 percent, while the nonfarm population increased by 12 percent.

About 35 percent of the land area in the two counties was classified as farm land in 1950. Of the total farm acreage, 86 percent was classified as land used for pasture. Average gross farm income in the two counties was \$3,960 in 1949. Ninety-two percent of the farm income in 1949 was derived from the sale of livestock and livestock products, and practically all of the remainder from the sale of crops. The average value of land and buildings in the two counties in 1950 was \$15,762, which was 76 percent higher than 5 years earlier. In 1950, 63 percent of the farms in the two counties were owned in full or in part. Fifty-five percent of the farmers worked off the farm in 1949, while about one-third worked 100 or more days off the farm. Approximately one-third of the farmers reported other income of the family exceeding the value of farm products sold in 1949. Local business establishments in the service area and the lumber, coal, mining, and oil industries operating in or near the service area provide a source of off-farm employment. The topography of the area is characterized by arid basin lands interspersed with mountain ranges, hills, benchlands, and rolling plains, both smooth and broken, with considerable irrigated and irrigable land. The soils range from gravelly loam on the benchlands to silty clay loam on the lower elevations.

ULTIMATE NUMBER OF CONSUMERS

On July 31, 1953, this cooperative was serving a total of 2,428 consumers. The manager has estimated that a total of 3,220 consumers will be served by 1963. From a careful consideration of related facts pertaining to the area, an estimate of 3,100 ultimate consumers appears to be reasonable.

ESTIMATED FUTURE CONSUMPTION OF ELECTRICITY

This system was energized in 1939. Since 1941, average monthly farm consumption increased from 36 kwh to 241 kwh in 1952. This is an increase of 19 kwh in average monthly usage for each year. For the year ending July 31, 1953, average monthly farm consumption was 253 kwh. Farm consumers indicated that they expect to increase their use of electricity 52 percent by 1956. Nonfarm and town residential consumers indicated an increase of 32 and 27 percent, respectively, during the same period.

Active competition with LP and natural gas, the supply of combustible substitutes for use as fuel, and the inadequacy of some of the lines to carry the necessary load are serious deterrents to future use of electricity in this area. The survey indicated that two-thirds of the future indicated increase for farm and nonfarm consumers will be in active competition with LP and natural gas. Although there is not a plentiful supply of wood in the service area, there appears to be an adequate

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supply of coal, fuel oil, and gas. Respondents in localized rural areas indicated that low voltage is a serious problem.

Based on all factors believed to be significant, this analysis leads to the following monthly kwh estimates which are certified as being reasonable and may be expected to be attained in the years indicated:

<u>Class of Consumer</u>	<u>12 Months Ended July 31, 1953</u>	<u>1955</u>	<u>1958</u>	<u>1963</u>
Farm	253	310	365	420
Nonfarm Residential	235	275	310	320
Town Residential	148	180	215	270
Small Commercial	423	470	510	575
Public Buildings	269	280	290	310
Street and Highway Lights (annual)	11,549	12,000	12,000	12,000
Irrigation (annual) (20HP)	8,201	10,000	10,000	10,000
Oil Wells (annual) (22HP)	48,492	50,000	50,000	50,000
Large Commercial (annual)	<u>KW Demand</u>			
American Gilsonite	850	1,400,000	1,400,000	1,400,000
Rangely Sanitation District	10	30,000	35,000	40,000
Town of Rangely (Water Dept.)	50	60,000	65,000	70,000
Wesco Refinery	14	25,000	27,000	30,000
Stanolind Oil & Gas Co.	32	110,000	110,000	110,000
Utah Oil Refinery	22	85,000	85,000	85,000
The California Co.	175	600,000	600,000	600,000
Staley Coal Co.	275	35,000	35,000	35,000
Artesia Power Co.)	--	110kw	120kw	130kw
		440,000	475,000	525,000

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October 19, 1953

Economic Analysis Section
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ANALYSIS OF BASIC FACTORS RELATED TO
THE RURAL ELECTRIFICATION LOAN FOR
UTAH 8 DUCHESNE

This analysis of the probable future consumption of electricity by consumers of the Moon Lake Electric Association, Incorporated, with headquarters at Altamont, Utah, (Figure 1), is based on a field study conducted by Vergil Bufford and William B. Kingree, Agricultural Economists, Economic Analysis Section, Electric Operations and Loans Division. This analysis was made by Mr. Kingree. The field work consisted primarily of interviews with 175 served and prospective consumer units. Of these, 74 were served farm consumers, 5 were potential farm consumers, 31 were served nonfarm consumers, 31 were served town consumers, and 34 were served large commercial consumers.^{1/} In addition, local bankers and agricultural leaders were consulted as to local economic trends and their estimates of the future for the area with respect to the use of electric power.

ULTIMATE NUMBER OF CONSUMERS

On July 31, 1953, this cooperative was serving a total of 2,428 consumers. The manager has estimated that a total of 3,220 consumers will ultimately receive service (see manager's letter on following page). This is an increase of 33 percent over those presently receiving service. Presumably, the ultimate number includes those consumer units anticipated due to increased habitation in the area as well as those presently served who are expected to remain.

Table VIII shows that the combined total population of Duchesne and Uintah Counties has fluctuated upward during the past 20 years. At the same time the farm population of the two counties and the number of farms therein have been decreasing. The average size of farms has been increasing, which indicates a consolidation of small units into larger and probably more efficient units. On July 31, 1953, the cooperative served a total of 1,470 farm consumers, 186 rural-nonfarm consumers, and had services run, but not connected to 36 farm consumers.

^{1/} Farm, nonfarm, and town residential consumers were selected at random and comprise a tabular list sample of consumer units at the following rates: farm consumers 5 percent, nonfarm consumers 17 percent, and town consumers 7 percent.

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The results of an unelectrified farm survey completed August 13, 1953 are as follows:

Establishments Served ^{a/}		2,601
Potentials	118	
Services Run Not Connected	52	
Disconnected	12	
Abandoned	17	
Vacant	96	
		<u>295</u>
Total		2,896

^{a/} Possibly more than one establishment per consumer, especially in cases of oil pumps and oil wells.

If the abandoned homes are renovated, occupied, and take service, and if the vacant homes are occupied and take service along with the potential and disconnected consumers, there would be an increment of 243 rural consumers. This would establish a total of 1,935 rural consumers. The manager has estimated that ultimately 2,292 rural consumers, excluding irrigation, will receive service. This figure includes 1,906 farm and 386 rural-nonfarm consumers. The latest power requirement study (February 1952), which does not take into consideration a recent acquisition, indicates that 1,590 farm consumers will be receiving service by 1962.

Table VIII indicates that there are 1,900 farms in the two counties, and there are an undisclosed number of farms in the previously mentioned acquisition.

A consideration of the findings of the unelectrified farm survey and the data presented in Table VIII in conjunction with the manager's estimates tends to support an estimate of 3,100 as ultimate, or the number that might reasonably be expected in 10 years. This estimate is 30 percent less than the manager's estimate of farm consumers to be added in the future.

Consumer Class	Operating: Report : 7/31/53	Services Run But Not Connected	1962 Estimate : Power Re- quirement: Study ^{a/}	Manager's Estimate : of Ultimate Consumers	Estimated Number of Ultimate Consumers
Farm	1,470	36	1,590	1,906	1,786
Nonfarm Residential	186	--	390	386	386
Town Residential	415	--	500	500	500
Small Commercial	310	6	322	326	326
Large Commercial	33	--	24	53	53
Irrigation	8	10	48	43	43
Public St. & Hwy. Ltg.	4	--	--	4	4
Other Utilities	2	--	1	2	2
Total	2,428	52	2,875	3,220	3,100

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a/ This study was completed in February 1952. Since that date subject system has made an acquisition of existing facilities in a section of Rio Blanco County, Colorado. The acquisition included served town consumers, large and small commercial consumers, public street and highway lighting, and some potential farm and nonfarm consumers.

NATURE OF PRESENT AND INDICATED FUTURE CONSUMPTION
OF ELECTRICITY AS REVEALED BY THE SURVEY

TABLE I

INDICATED MONTHLY KWH CONSUMPTION^{a/}

Consumer Class	Present	Future ^{b/}	Percent Increase
Farm	240	364	52
Nonfarm	226	299	32
Town Residential	226	286	27
Potential Farm	—	409	—

a/ Based on indications by respondents in the survey and average energy requirements as determined by REA on a countrywide basis. Farm consumers in the survey were using electricity at 103 percent of the average rate established by REA on a countrywide basis. Nonfarm consumers were also using 103 percent, while town residential consumers were using about 66 percent of the average.

b/ Based on what respondents expect to add in 3 years.

A comparison of the potential farm consumers' indicated initial average consumption with actual averages in Table II shows that the initial average consumption of these consumers would be about 70 percent greater than the present actual average of respondents in the survey.

Historical consumption records for farm, nonfarm, and town residential consumers in the survey indicate a rising average consumption. This is shown in Tables II and III. Generally, farm and nonfarm consumers added since 1946 have attained higher initial averages than those connected over a longer period. It is evident from Tables I, II, and III that farm and nonfarm consumers are using the average kwh per appliance as determined by REA for the country at large, while the town residential consumption per appliance is below this average.

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TABLE II .

AVERAGE MONTHLY KWH CONSUMPTION OF
91 FARM AND NONFARM CONSUMERS

Total Number : Number :		Average KWH Consumption Per Month													
of Years With:	of :	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953 ^{a/}
Electricity	Schedules														
14	23	40	43	57	61	63	67	74	79	116	133	201	284	301	338
13	5	—	28	40	34	41	42	42	46	60	61	84	97	98	113
12	2	—	—	35	35	25	62	66	65	82	181	271	248	290	350
11	1	—	—	—	18	23	72	81	75	48	99	47	57	56	54
10	1	—	—	—	—	79	197	242	313	583	1162	1283	1308	1982	1529
9	7	—	—	—	—	—	65	80	93	134	142	177	244	280	291
8	3	—	—	—	—	—	—	36	85	125	104	228	225	237	308
7	3	—	—	—	—	—	—	—	95	184	154	204	193	297	424
6	3	—	—	—	—	—	—	—	—	50	42	67	79	62	64
5	10	—	—	—	—	—	—	—	—	—	88	107	113	110	126
4	5	—	—	—	—	—	—	—	—	—	—	60	61	95	106
3	8	—	—	—	—	—	—	—	—	—	—	—	141	198	205
2	13	—	—	—	—	—	—	—	—	—	—	—	—	177	215
1	7	—	—	—	—	—	—	—	—	—	—	—	—	—	85
Weighted Average		40	40	53	54	56	67	72	83	120	134	175	206	229	240

^{a/} Through July.

TABLE III

AVERAGE MONTHLY KWH CONSUMPTION OF
28 TOWN RESIDENTIAL CONSUMERS^{a/}

Total Number of Years With Electricity	Number of Schedules	Average KWH Consumption Per Month	
		1952 ^{b/}	1953 ^{c/}
2	20	120	161
1	8	—	128
Weighted Average		120	152

^{a/} Respondents live in the town of Rangely, Colorado. This town was acquired by the cooperative in 1952.

^{b/} Last 6 months of 1952.

^{c/} Through July.

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A saturation of electrical appliances and equipment measured in terms of the percent of consumers presently having them and a corresponding percent anticipated in the future was compiled from field schedules of presently connected consumers. The difference in saturation, as shown by the increase in percentage points, was converted to future kwh requirements per 100 consumers for each appliance and piece of equipment. This tabulation is shown in Table IV.

PHYSICAL CHARACTERISTICS

The major part of the service area is located in northeastern Utah, in Duchesne and Uintah Counties. It also extends into the western part of Rio Blanco County, Colorado. The topography of the area is characterized by arid basin lands interspersed with mountain ranges, hills, benchlands, and rolling plains, both smooth and broken, with considerable irrigated and irrigable land. Generally, surface drainage is adequate. In localized areas, however, runoff water has cut deep gullies in the land. The soils range from gravelly loam on the mesas, or benchlands, to silty clay loam on the lower elevations. Average annual precipitation in Duchesne and Uintah Counties is 9.4 inches. The growing season averages 124 days.

ECONOMIC CHARACTERISTICS

During the period 1930-1950, the combined total population of Duchesne and Uintah Counties increased by about 7 percent. The farm population during this period decreased by approximately 25 percent, while the nonfarm population increased by 12 percent.

About 35 percent of the land area in the two counties was classified as farm land in 1950. Of the total farm acreage, 86 percent was classified as land used for pasture. About 50 percent of the total land area of the two counties is either in national forest or Indian reservation lands. Part of the remaining land area is public domain and part of it is wasteland.

From 1945-1950, the number of farms in the two counties decreased by 5 percent, while the average size of farms increased by 54 percent. The average value of land and buildings in 1950 was \$15,762, as compared with \$8,936 in 1945. Compared with the State of Utah, the two counties in 1950 had 14 percent more of the land area in farms, an 18 percent lower valuation of land and buildings, and about a 400 percent greater average size of farms.

Average gross farm income in the two counties was \$2,626 in 1944 and \$3,960 in 1949, as compared with the Utah State average of \$3,669 in 1944 and \$5,389 in 1949. In 1949, the sale of livestock and livestock products accounted for 85 percent of the farm income in the two counties, as compared with 92 percent in 1944. Of the income from the sale of livestock and livestock products in 1949, 30 percent in Duchesne County, as compared with 16 percent in Uintah County, was derived from the sale of poultry and poultry products and dairy products. Sale of forest products accounted for less than 1 percent of the farm income in 1949. Receipts from crops accounted for the remainder of the income in both counties in 1949.

TABLE IV

PRESENT AND INDICATED SATURATION OF ELECTRICAL APPLIANCES AND
EQUIPMENT AND CORRESPONDING INDICATED INCREASE IN KWH
USAGE FARM, NONFARM AND TOWN RESIDENTIAL CONSUMERS

APPLIANCE OR EQUIPMENT	FARM AND NONFARM				TOWN RESIDENTIAL			
	PERCENT OF CONSUMERS	INCREASE	KWH USAGE	PERCENT OF CONSUMERS	INCREASE	KWH USAGE		
: PRESENTLY: INDICATING: PERCENTAGE: PER 100 : PRESENTLY: INDICATING: PERCENTAGE: PER 100 :								
: USING : FUTURE USE: POINTS : CONSUMERS: : USING : FUTURE USE: POINTS : CONSUMERS :								
ADDING MACHINE	1	1	—	—	—	—	—	
AIR CONDITIONING UNIT	—	—	—	—	—	—	—	
AIR COMPRESSOR	2	3	35	16	23	7	14,000	
ANIMAL CLIPPER	1	—	—	3	3	—	—	
BATH	—	—	600	—	—	—	—	
BATTERY CHARGER	5	5	—	3	3	—	—	
BLANKET	4	5	150	6	6	—	—	
BROILER	3	3	—	3	3	—	—	
BROODER (HOVER)	19	28	2,070	—	—	—	—	
CHURN	8	8	—	—	—	—	—	
CLOCK	50	56	108	71	71	16	11,200	
CLOTHES DRIER	4	9	3,500	7	23	—	—	
COAL STOKER	9	11	480	—	—	—	—	
CONCRETE MIXER	1	1	—	—	—	—	—	
CREAM SEPARATOR	10	10	—	—	—	—	—	
DEEP FRYER	—	—	—	6	6	—	—	
DISHWASHER	2	2	—	—	—	—	—	
DRILL PRESS	16	19	36	10	13	3	90	
EDGER	1	1	—	—	—	3	36	
EGG BOTTLER	—	—	—	3	3	—	—	
EVAPORATIVE COOLER	1	1	—	—	—	—	—	
FAN (CENT. HOT AIR CIR.)	12	13	240	6	13	7	504	
FAN (HOUSEHOLD)	8	9	15	16	19	3	45	
FAN, VENTILATOR	—	—	—	—	—	—	—	
(POULTRY LAYING HOUSE)	2	2	—	—	—	—	—	
FEED CHOPPER	1	2	12	—	—	—	—	
FEED MIXER	—	—	12	—	—	—	—	
FENCE	11	12	50	—	—	—	—	
FENDER BUFFER	1	1	—	—	—	—	—	
FOOD MIXER	38	42	100	61	65	4	100	
FORGE	1	1	—	—	—	—	—	
FREEZER (HOME)	29	50	18,900	32	58	26	23,400	
GARBAGE DISPOSAL	—	—	—	—	—	3	72	
GARDEN WATERING	15	19	300	—	—	—	—	
HAIR CLIPPERS	1	1	—	—	—	—	—	

2-Table IV - Utah 8 Duchesne - October 19, 1953

APPLIANCE OR EQUIPMENT	FARM AND NONFARM				TOWN RESIDENTIAL			
	PERCENT OF CONSUMERS		INCREASE		PERCENT OF CONSUMERS		INCREASE	
	INDICATING	PERCENTAGE	PER 100	PERCENTAGE	INDICATING	PERCENTAGE	PER 100	PERCENTAGE
	USING	FUTURE USE	POINTS	CONSUMERS	USING	FUTURE USE	POINTS	CONSUMERS
HEADBOLT HEATER	1	3	2	30	3	3	3	3
HEATING PAD	20	21	1	3	42	42	42	42
HOT PLATE	41	43	2	140	13	16	3	210
HOT WATER CIR.PUMP	—	—	—	—	—	3	3	360
ICE-CREAM FREEZER	1	1	—	—	—	3	3	300
IRON	91	92	1	100	94	97	—	—
IRONER	3	4	1	120	19	19	—	—
JOINTER	1	1	—	—	—	—	—	—
LAMP--(GERMICIDE)	—	—	—	—	3	3	—	—
LATHE	—	2	2	24	—	—	—	—
LAWN-MOWER	—	—	—	—	6	6	—	—
LIGHTING:	—	—	—	—	—	—	—	—
BEEF CATTLE BARN	2	2	—	—	—	6	—	—
BUNK HOUSE	—	—	—	—	—	—	—	—
CAVE OR SPRING HOUSE	3	4	1	5	—	—	—	—
DAIRY BARN	6	8	2	70	—	—	—	—
FLOOD LIGHTS	1	1	—	—	—	19	—	—
GARAGE	8	10	2	16	—	—	—	—
GENERAL BARN	15	18	3	72	—	—	—	—
GRAIN & FEED STGE.BLDG.	—	2	2	4	—	—	—	—
HOG BARN	1	1	—	—	—	—	—	—
HOUSE LIGHTING	96	96	—	—	100	100	—	—
MILK HOUSE	2	4	2	70	—	—	—	—
OFFICE	2	2	—	—	—	—	—	—
OTHER BUILDINGS	11	11	—	—	—	—	—	—
POULTRY BROODER HOUSE	5	6	1	5	—	—	—	—
POULTRY LAYING HOUSE	20	31	11	385	10	13	3	36
POULTRY LAYING HOUSE (COMMERCIAL)	—	2	2	280	—	—	—	—
SHOP	5	11	6	72	3	3	—	—
YARD	31	41	10	180	3	3	—	—
LIVESTOCK WATERING	11	12	1	180	—	—	—	—
MILK COOLER	7	9	2	3,462	—	—	—	—
MILKING MACHINE	12	17	5	1,510	—	—	—	—
OIL FURNACE	4	5	1	300	3	3	—	—
PERCOLATOR	11	12	1	60	36	36	—	—
POWER SAW	15	18	3	36	10	10	—	—
PRESSURE SYSTEM (LESS THAN 22')	20	29	9	1,620	3	3	—	—
PRESSURE SYSTEM (GREATER THAN 22')	23	31	8	1,920	—	—	—	—
RADIO	96	100	4	400	107	107	—	—

3-Table IV - Utah 8 Duchesne - October 19, 1953

APPLIANCE OR EQUIPMENT	FARM AND NONFARM				TOWN RESIDENTIAL			
	PERCENT OF CONSUMERS USING	INDICATING FUTURE USE	PERCENTAGE POINTS	INCREASED KWH USAGE	PERCENT OF CONSUMERS USING	INDICATING FUTURE USE	PERCENTAGE POINTS	INCREASED KWH USAGE
RANGE	38	56	18	21,600	10	13	3	3,600
RAZOR	1	1	—	—	6	6	—	—
REFRIGERATOR	90	93	3	1,080	81	90	9	3,240
ROASTER	11	11	—	—	3	3	—	—
SANDWICH GRILL	1	1	—	—	—	—	—	—
SEWING MACHINE	28	31	3	30	29	32	3	30
SOLDERING IRON	10	12	2	30	—	—	—	—
SPACE HEATER (PORTABLE)	7	9	2	140	16	16	—	—
STOCK TANK DEICER	—	1	1	150	—	—	—	—
STOCK TANK HEATER	1	6	5	750	—	—	—	—
TELEVISION RECEIVER	—	1	1	360	—	—	—	—
TOASTER	55	58	3	105	71	74	3	105
TOOL GRINDER	19	23	4	100	3	3	—	—
VACUUM CLEANER	39	49	10	200	48	55	7	140
VENTILATOR (WINDOW)	—	—	—	—	6	6	—	—
VIBRATOR	1	1	—	—	—	—	—	—
WAFFLE IRON	43	46	3	75	61	61	—	—
WASHING MACHINE	87	92	5	175	65	68	3	105
WATER HEATER WITH BATH	17	36	19	57,000	29	32	3	9,000
WATER HEATER WITHOUT BATH	2	5	3	7,200	3	3	—	—
WATER HEATER (PRESSURE TYPE)	5	7	2	4,000	—	—	—	—
WELDER	9	14	5	375	—	—	—	—
WOOD SAW	2	2	—	—	—	—	—	—

A/ BASED ON INDICATIONS OF PRESENTLY CONNECTED CONSUMERS.

B/ BASED ON AVERAGE ENERGY REQUIREMENTS DETERMINED BY REA. DATA DO NOT REFLECT INSTANCES WHERE MORE THAN ONE OF THE SAME APPLIANCE EXIST PER CONSUMER. THESE CASES ARE RARE AND DO NOT AFFECT THE OVER-ALL PATTERN MATERIALLY.

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Farms reporting livestock in both counties in 1950 had averages of 36 cattle, 6 hogs, 230 sheep, 64 chickens, and 5 horses. Generally, ranch-type enterprises predominate throughout the service area; in localized areas, however, dairy and poultry farming is very important. Although livestock farming predominates, production of field crops is important. Average yields per acre for the major crops in the two counties in 1949 were: hay 2 tons, oats 40 bushels, barley 42 bushels, spring wheat 30 bushels, winter wheat 22 bushels, and corn 34 bushels. These yields are comparable to those of the State for 1949. In 1949, ditch irrigation was used in the production of all crops and about 5 percent of the pasture.

In 1950, 63 percent of the farms in the two counties were owned in full or in part. In 1945, 91 percent of the farm operators, as compared with 92 percent in 1950, resided on the farm they operated. Fifty-five percent of the farmers, in 1949, as compared with 41 percent in 1944 reported working off the farm, while 31 percent in 1949, as compared with 24 percent in 1944, reported working 100 or more days off the farm. About 32 percent of the operators reported other income of the family exceeding the value of farm products sold in 1949.

In 1950, 55 percent of the farms had one or more trucks, 51 percent had one or more tractors, and 65 percent had one or more automobiles.

Thirty-eight percent of the farms in the two counties are located alongside a hard-surfaced or gravel road. An average distance of .8 miles to a trading center was reported, with 51 percent of the farms being less than 5 miles from such center.

Opportunity for nonfarm employment is afforded by local business establishments within the service area, and by the lumber, coal mining, and oil industries operating in or near the area.

Deposits of phosphate, ilsemaninite, copper, iron ore, lead, silver, gold, asphalt, coal, oil, and gas have been reported in the area. Asphalt, oil, and gas are produced commercially.

According to banks visited in the area, the ratio of deposits to loans is 2.2 to 1.0. Bank officials estimated that farmers owned 50 percent of the demand deposits, and that between one-half and two-thirds of the banks' loans were to farmers. Supervisors of the Farmers' Home Administration Offices reported a total of 280 loans outstanding in the two counties. These loans averaged \$4,693 each.

ANALYSIS OF FUTURE CONSUMPTION

This system was energized in 1939. Since 1941, average monthly farm consumption increased from 36 kwh to 241 kwh in 1952. This is an increase of 19 kwh in average monthly usage for each year. For the year ending July 31, 1953, average monthly farm consumption was 253 kwh. Table II shows that new consumers are generally being added at levels of consumption of approximately four times that of the initial consumption of the earlier consumers.

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If farm consumption is to increase at the rate indicated in Table I, we might expect an average monthly farm figure of 385 kwh (253×1.52). The average monthly nonfarm figure would be 310 kwh (235×1.32), and the average monthly town residential figure would be 188 kwh (148×1.27). To achieve these increases, the specific additional kwh resulting from indicated future saturation of appliances and equipment as shown in Table IV must be attained.

Approximately 87 percent of the indicated increased use for farm and nonfarm consumers would need to occur in the household (Table V). Moreover, 80 percent of this indicated increase would need to occur as a result of the addition of water heaters, ranges, and home freezers. About four-fifths of the indicated use for major productive items would need to occur on dairy and poultry farms.

TABLE V

INDICATED AND ESTIMATED KWH USAGE, FARM AND NONFARM
CONSUMERS BY CHARACTER OF LOAD PER 100 CONSUMERS^a

Use	Indicated Future Saturation	Indicated Increase	Percent of Indicated Increase	Estimated Increase	Present Use	Estimated Future Total
<u>Major Household Uses</u>						
Water Heater	41	65,879	49.1	32,940	57,536	90,476
Range	56	22,372	16.7	13,423	47,092	60,515
Home Freezer	50	19,467	14.5	17,520	26,512	44,032
Clothes Drier	9	3,461	2.6	3,115	2,740	5,855
Pressure System (Greater than 22')	31	1,879	1.4	1,597	5,883	7,480
Pressure System (Less than 22')	29	1,594	1.2	1,355	3,708	5,063
Refrigerator	93	1,409	1.0	1,268	33,557	34,825
<u>Major Productive Uses</u>	--	13,964	10.4	11,869	38,379	50,248
<u>All Other Uses</u>	--	4,153	3.1	3,530	76,232	79,762
<u>Total</u>		134,178	100.0			

Estimated annual average increase (total) in kwh consumption per 100 consumers - 1956 86,617 -- 378,256

Estimated annual average increase (total) in kwh consumption per consumer - 1956 866 -- 3,783

Estimated monthly average increase (total) over a 3-year period - 1953-1956 72 -- 315

a/ Adjusted. Appliance usage and amount of electricity is 103 percent of the average for the United States as determined by REA.

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Table VI shows that 70 percent of the farm consumers in the survey indicated they were using electricity at a monthly rate of 120 or more kwh. Of the consumers represented by the groups using 120 or more kwh monthly, 77 percent indicated they intended to increase their monthly consumption by an average of 179 kwh each per month during the next 3 years. Although the ratio of indicated monthly consumption to indicated monthly increase is greater in the lower consumption groups, the average monthly increase for these groups is much lower than the increase for the higher consumption groups. If all farm consumers in the system area follow the pattern for increasing consumption indicated by those farm consumers in the survey, 70 percent will be using 200 or more kwh monthly at the end of 3 years. These data may have some significance in reviewing the present rate structure and in devising new rate schedules for future use on this system.

TABLE VI

ANALYSIS OF PRESENT AND FUTURE INDICATED CONSUMPTION:
DISTRIBUTION OF CONSUMERS AND RELATION OF PROPOSED
TO PRESENT USAGE ACCORDING TO RATE BLOCK^a

Rate Block	: Percent Of All Consumers	: Percent Of Consumers Indicating An Increase	: Percent Of All Consumers After Increases Have Taken Place (End Of 3-Year Period)	: Indicated: Monthly Consumption	: Indicated: Monthly Increase ^b	: Indicated Increase as % of Indicated Present Use
Under 40 kwh	2.7	50.0	1.4	38	15	39.5
40-80 kwh	9.5	42.9	6.8	69	81	117.4
80-120 kwh	17.6	69.2	10.8	97	106	109.2
120-200 kwh	28.4	61.9	12.1	167	158	94.6
200-400 kwh	24.3	88.9	25.7	267	128	47.9
400-600 kwh	12.1	88.9	31.1	468	159	34.0
600 and Over	5.4	75.0	12.1	854	31	3.6

^a/ Based on all farm consumers in the survey.

^b/ Includes all farm consumers in the survey.

There are other factors which must be considered in arriving at estimates of electric consumption. Among these are (1) the extent to which LP and natural gas competition is likely to reduce the indicated future increases in electrical usage, (2) the supply of substitutes for use as fuel for cooking and heating water, (3) the adequacy of rural lines to carry the necessary load, and (4) the extent to which other related economic trends are likely to have their impact upon the indicated future consumption.

TABLE VII

STATUS OF LP AND NATURAL GAS USE 130 RESPONDENTS
REPORTING IN RANDOM SAMPLE SURVEY^{a/}

Consumers' Position With Respect to Use of Gas	:: Number in Survey		:: Percent of Total	
	:: Farm and: Town		:: Farm and: Town	
	:: Nonfarm: Residential		:: Nonfarm: Residential	
Not using and not planning to use	80	1	80.8	3.2
Not using but planning to use	2	—	2.0	—
Using LP gas	17	—	17.2	—
Using natural gas	—	30	—	96.8
	99	31	100.0	100.0
Used For:				
Cooking	13	25	13.1	80.6
Water Heating	6	10	6.1	32.3
Refrigeration	—	4	—	12.9
House Heating	10	23	10.1	74.2
Planning to change to electricity in the future	1	3 ^{b/}	1.0	—
Not planning to change to electricity in the future (3 years)	15	30	15.2	96.8
Planning to change to electricity in the future if electric service improves	1	—	1.0	—

a/ All served farm, nonfarm, and town residential respondents indicating use of gas.

b/ Three respondents indicated that they were planning to dispose of only certain gas appliances.

Table VII indicates that about 17 percent of the farm and nonfarm and 97 percent of the town residential consumers are presently using LP or natural gas for one or more purposes. One percent of the farm and nonfarm consumers indicated their intention to change to electricity in the future and 1 percent indicated they had tentative plans to dispose of their gas appliances, while 2 percent not now using gas indicated they planned to do so in the future. Two-thirds of the future indicated increase for farm and nonfarm consumers will be in active competition with LP gas. Of the five potential consumers, three were using LP gas and two of the three indicated that they planned to change to electricity when central station service becomes available.

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The retail rate schedule in effect at the time of the appraisal is as follows:

SCHEDULE A. Farm and Home Service

First 30 kwh, or less, per month \$2.70 (minimum)
Next 30 kwh per month @ 4.0¢ per kwh
Next 40 kwh per month @ 3.0¢ per kwh
Next 100 kwh per month @ 2.0¢ per kwh
Over 200 kwh per month @ 1.5¢ per kwh

Special Service for Small Farms and Homes

SCHEDULE C. Having a Demand of Not Over 15 Amperes

First 16 kwh, or less, per month \$1.50 (minimum)
All over 16 kwh per month @ 9.0¢ per kwh

SCHEDULE B. Commercial and Small Power Service

First 30 kwh, or less, per month \$2.70 (minimum)
Next 30 kwh per month @ 4.0¢ per kwh
Next 40 kwh per month @ 3.0¢ per kwh
Next 2900 kwh per month @ 2.5¢ per kwh
Over 3000 kwh per month @ 2.0¢ per kwh

SCHEDULE E. Service to Schools, Churches and Community Halls

First 30 kwh per month @ 9.0¢ per kwh
Next 30 kwh per month @ 4.0¢ per kwh
Next 30 kwh per month @ 3.0¢ per kwh
Next 900 kwh per month @ 2.5¢ per kwh
Over 1000 kwh per month @ 1.5¢ per kwh
Minimum charge - \$18.00 per year

SCHEDULE A-R. Residential Service Rangely

First 50 kwh per month @ 9.0¢ per kwh
Next 50 kwh per month @ 5.0¢ per kwh
Next 100 kwh per month @ 3.0¢ per kwh
Over 200 kwh per month @ 2.0¢ per kwh
Minimum charge - \$2.70 per month

For separately metered service to water
heaters conforming to specifications-1.5¢ per kwh

SCHEDULE B-R. Commercial and Small Power Service-Rangely

First 50 kwh per month @ 9.0¢ per kwh
Next 50 kwh per month @ 7.0¢ per kwh
Next 200 kwh per month @ 5.0¢ per kwh
Next 1000 kwh per month @ 4.0¢ per kwh
Next 1700 kwh per month @ 3.0¢ per kwh
Over 3000 kwh per month @ 2.0¢ per kwh
Minimum charge - \$2.70 per month

SCHEDULE LP - Large Power Service

\$2.30 per month per kw of billing demand for the first 100 kw

\$1.80 per month per kw of billing demand for all over 100 kw

Plus energy charges of—

2.0¢ per kwh for the first 100 kwh used per month per kw of billing demand

1.5¢ per kwh for the next 100 kwh used per month per kw of billing demand

0.65¢ per kwh for all remaining kwh used per month.

The minimum monthly charge shall be the highest one of the following charges as determined for the consumer in question:

- (1) The minimum monthly charge specified in the contract for service.
- (2) A charge of \$0.75 per KVA of installed transformer capacity.
- (3) A charge of \$25.00.

Street Lighting

Incandescent lamps, burning from dusk to dawn

250 c.p. series lamps, per lamp, per year \$33.00

200 watt multiple lamps, per lamp, per year \$39.00

150 watt multiple lamps, per lamp, per year \$33.00

100 watt multiple lamps, per lamp, per year \$27.00

Mercury vapor lamps, ornamental, burning from dusk to dawn

400 watt, mercury vapor lamp, per unit, per year \$78.00

Additional use of electricity resulting from ranges and water heaters depends on the supply of combustible substitutes in the area. Although there is not a plentiful supply of wood in the area, there appears to be an adequate supply of coal, fuel oil, and gas. Another factor affecting use of electricity is low voltage and the frequency of outages on some of the lines. Respondents in localized rural areas indicated that low voltage is a serious problem. One respondent indicated that she kept a gas stove on standby status for use when the electric range was inoperative due to low voltage. In order to alleviate these conditions, it appears that it may be necessary to rephase some of the lines. It is unreasonable to assume that these respondents will add new appliances or equipment while they are unable to obtain maximum use from those appliances or pieces of equipment which are presently connected.

From Table VIII, trends in the area relative to the State indicate the service area to be increasing slightly in importance both absolutely and relatively. During the past two decades, the population of the area has increased slightly. At the same time there has been a decrease in the number of farms in the area. This is probably due to consolidation of smaller units into larger enterprises. Somewhat more favorable is the relation of average farm income and average value of land and buildings in the area as compared with the State.

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TABLE VIII

TRENDS RELATED TO THE RATE OF INCREASE
IN USE OF ELECTRIC POWER

Item and Relationship		Trend					
				%Change		%Change	
		1920	1930	1920-30	1940	1930-40	1950
							1940-50
<u>Population</u>							
Duchesne County		9,093	8,263	- 9.1	8,958	+ 8.4	8,134
Uintah County		8,470	9,035	+ 6.7	9,898	+ 9.6	10,300
Counties Combined		17,563	17,298	- 1.5	18,856	+ 9.0	18,434
State of Utah		449,396	507,847	+13.0	550,310	+ 8.4	688,862
Ratio Area to State		.039	.034	--	.034	--	.027
				%Change		%Change	
		1930	1935	1930-35	1940	1935-40	1945
<u>Number of Farms</u>							
Duchesne County	1,050	1,201	+14.3	1,104	- 8.1	1,044	- 5.4
Uintah County	1,076	1,391	+29.2	1,123	-19.3	951	-15.3
Counties Combined	2,126	2,592	+21.9	2,227	-14.1	1,995	-10.4
State of Utah	27,159	30,695	+13.0	25,411	-17.2	26,322	+ 3.6
Ratio Area to State	.078	.084	--	.088	--	.076	--
				%Change		%Change	
		1939	1944	1949	1939	1944	1949
<u>Average Income From</u>							
<u>All Farm Products Sold</u>							
Duchesne County		\$ 949	\$2,608	\$4,026			
Uintah County		1,058	2,646	3,894			
Combined Average		1,004	2,627	3,960			
State of Utah		1,569	3,669	5,389			
Ratio Area to State		.64	.72	.73			
		1930	1935	1940	1945	1950	
<u>Average Value of</u>							
<u>Land and Buildings</u>							
Duchesne County		\$4,998	\$3,005	\$3,197	7,249	\$18,203	
Uintah County		5,523	3,389	4,269	\$10,662	13,321	
Combined Average		5,260	3,197	3,733	8,956	15,762	
State of Utah		8,145	5,157	6,074	9,947	19,146	
Ratio Area to State		.65	.62	.61	.90	.82	

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Considering the present use and probable continued use of LP and natural gas in the service area, the supply of wood and coal for use as fuel, the reported low voltage on some of the lines, and the general observation that, on a countrywide basis, respondents' indications in the past regarding future usage of electricity have been optimistic, the attainment of the indicated consumption within a 3-year period appears to be unlikely at this time. On the basis of these and related factors, it is estimated that within 3 years 50 percent of the indicated increase for water heaters will be attained. It is also expected that 60 percent of the indicated increase attributed to ranges, 90 percent to home freezers, clothes driers, and refrigerators, and 85 percent to major productive uses, pressure systems, and all other uses will be realized. Kilowatt-hour increases at these rates are shown in Table V.

